Industrial Minerals review 2024

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Additional notes: (1) Among the information sources cited in the articles are the U.S. Geological Survey (USGS) Mineral Commodity Summaries 2025 (https://www.usgs.gov/centers/national-minerals-information-center/mineral-commodity-summaries). The USGS Mineral Commodity Summaries are published on an annual basis and are the earliest government publications to furnish estimates covering nonfuel mineral industry data. The data sheets contain information on the domestic industry structure, government programs, tariffs and five-year salient statistics for more than 90 individual minerals and materials. USGS Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government. (2) Throughout this review, measurements are expressed as metric units unless the author provided conversions.

Foreword by Mike O'Driscoll, IMFORMED

There is no doubt, if any existed, that the commercial minerals world has now moved into a new era of unprecedented challenges in the sourcing, mining, processing, trade and use of industrial minerals.

Industrial (nonmetallic) minerals remain the often unsung workhorse of mineral commodities and specialist raw materials that frankly keep the world's manufacturing industries ticking over, and everyday products we use in sound availability. They are also very much present among the so-called "critical minerals" necessary to advance cutting-edge developments in growing high-tech markets such as in energy transition: for example, lithium, rare earths, graphite and fluorspar.

Indeed, in the United States during 2024, industrial minerals again accounted for the majority share of total mine production by value at $72.1 billion, or 54 percent, followed by metals, 25 percent, and coal, 21 percent, according to the latest data from the U.S. Geological Survey (USGS).

But right now, "industry resilience" seems to be the rallying call, with industrial mineral producers and traders facing straitened times from market slowdowns; environmental regulations; decarbonization and other sustainability issues; pressure to diversify; and near-shore mineral sourcing, and, yes, geopolitics.

The last few years have witnessed a series of geopolitical issues that have impacted and continue to impact international trade in industrial minerals. Above all, it has been the threat and implementation of recent trade tariffs between countries that have been most damaging in creating a potential trade war.

U.S. trade tariff tumult unleashed

The end of 2024 and the first quarter of 2025 saw perhaps the most dramatic episode of trade tariff threats and sanctioning, which have

Tunnel vision? The Las Cuevas Mine near San Luis Potosi, Mexico, operated by Koura Global, is the world's largest fluorspar mine. Fluorspar is a designated critical mineral, of which the United States is 100 percent reliant on imports.

impacted mineral commodities trade between the United States and the rest of the world, especially China.

Rare earths have always been a familiar stamping ground in this arena, but now many other minerals are in the mix.

By the seventh week of the new U.S. administration, the trading world was steeling itself against the latest round of U.S. trade tariffs on March 4, brought to bear on Canada (25 percent), China (doubled to 20 percent) and Mexico (25 percent).

Then on April 2, the industry was sent reeling by President Donald Trump's sweeping "Liberation Day" announcement of so-called "reciprocal" tariff rises for all U.S. imports, which added 34 percent to existing 20 percent duties on all Chinese imports (Canada and Mexico import tariffs unchanged).

The result was that some countries, particularly China, the European Union and Canada vowed to retaliate, thus fanning the flames for an impending trade war.

Since then, there has been backpedaling, pausing and revision of certain U.S. tariffs between certain countries, but it continues to be a very fluid and uncertain situation, yet to be fully resolved. Suffice to say that markets and trade have been negatively impacted.

For mineral producers, traders and consumers, it is an ongoing nightmare. Involved international traders, and crucially, U.S. consumers of these minerals are now busy assessing what the future may hold for the security and cost of maintaining their existing and planned mineral trade flows. Should the trade tariffs hold, then prices will certainly increase and impact U.S. consumers.

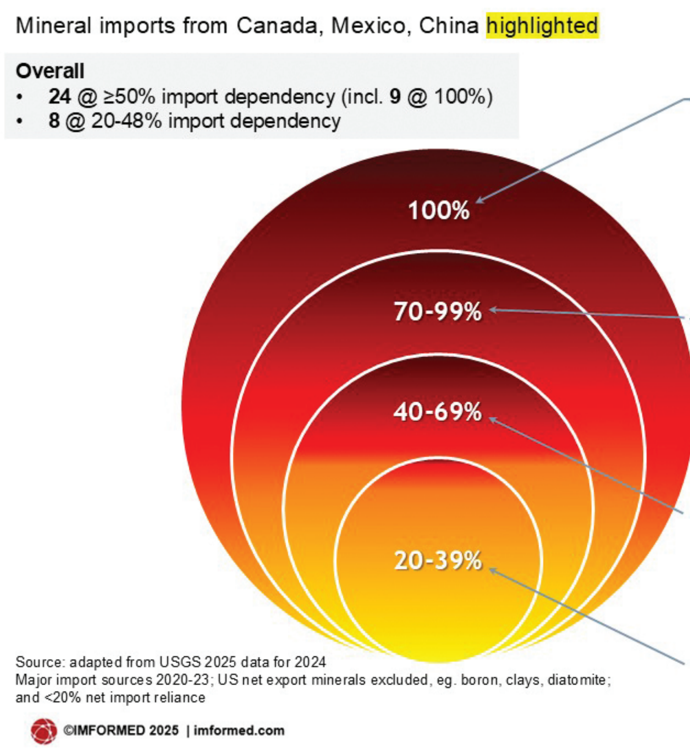
Reality check: U.S. has >50 percent import dependency on 24 industrial minerals

Leaving aside the rationale and debate over these tariffs, an analysis of the minerals and markets in the line of tariff fire is instructive in highlighting their importance to the U.S. (and world) economy, and indeed the vulnerability of and reliance on their limited sources.

Acknowledging this point right off the bat was the Essential Minerals Association (EMA; the representative voice for U.S. industrial

Figure 1

U.S. industrial mineral net import reliance, 2024.



Asbestos		Brazil, Russia
Bauxite (non-met)		CHINA, Guyana
Fluorspar		MEXICO, Vietnam, S. Africa, CHINA
Graphite (natural)		CHINA, CANADA, MEXICO, Mozambique
Mica (sheet)		CHINA, Brazil, India
Manganese		Gabon, S. Africa, Australia, Malaysia
Scandium		Japan, CHINA, Philippines
Strontium		MEXICO, Germany
Yttrium		CHINA, Germany
Fused alumina	>95%	CHINA, CANADA, Brazil, Austria
Neph. syenite	>95%	CANADA
Potash	93%	CANADA, Russia, Belarus, Israel
Iron oxide pig.	87%	CHINA, Germany, Brazil, CANADA
Titanium min.	86%	S.Africa, Madagascar, CANADA, Australia
Antimony	85%	CHINA, Belgium, India, Bolivia
Diamonds	81%	India, S. Africa, Russia, Australia
Rare earths	80%	CHINA, Malaysia, Japan, Estonia
Chromium	77%	South Africa, Kazakhstan, CANADA, Finland
Barite	>75%	India, CHINA, Morocco, MEXICO
Silicon carbide	69%	CHINA, Brazil, CANADA
Alumina	59%	Brazil, Jamaica, Australia, CANADA
Magnesia	52%	CHINA, Israel, Brazil, CANADA
Iodine	>50%	Chile, Japan
Lithium	>50%	Chile, Argentina
Garnet	48%	S. Africa, Australia, India, CHINA
Mica (scrap,flake)	41%	CHINA, CANADA, India, Finland
Vermiculite	34%	S.Africa, Brazil, Zimbabwe
Feldspar	33%	Turkey, MEXICO
Perlite	26%	Greece, CHINA
Bromine	<25%	Israel, Jordan, CHINA
Zircon	<25%	S.Africa, Australia, Senegal
Salt	24%	CANADA, Chile, MEXICO, Egypt

mineral producers) releasing a statement on March 3 urging the U.S. administration to "refrain from implementing tariffs on imports from Canada and Mexico" and seek alternative solutions.

The EMA statement warned: "tariffs would cause prices to rise steeply across the economy … many companies would see an increase in costs in the tens of millions of dollars per year, if not worse. The tariffs, instead of strengthening the domestic mineral supply chain, would cause U.S. manufacturers to become more reliant on foreign sources, including from hostile nations."

So, which industrial minerals are key to the U.S. economy? The United States has a 100 percent net import reliance on nine industrial minerals, more than 50 percent on 15 industrial minerals, and 20 to 48 percent import dependency on a further eight minerals — so, 32 industrial minerals in total.

Significantly, of these 32 minerals, 25 are sourced from Canada, China and Mexico, countries which are facing 20 to 25 percent import tariffs. These minerals are highlighted in Fig. 1, along with their respective import source countries and overall net import reliance as a percentage.

Tariff-targeted countries' supply to U.S.: Specific mineral analysis

Figure 2 shows more detail on the specific industrial minerals sourced for U.S. consumption from Canada, China and Mexico:

- Whether they are defined as a "critical mineral."
- Their overall U.S. net import reliance.
- Total import volume for 2024.
- The respective country's import share.
- Their primary market applications in the United States.

This may make sober reading for U.S. economists forecasting the fall-out for domestic manufacturing sectors from this latest round of U.S. trade tariffs.

Of critical minerals, Canada supplies four, China eight, and Mexico two — quite a tally (10 different critical minerals in total).

More examination reveals that these include critical minerals with considerable supply contributions from the tariff-targeted countries:

- Antimony oxide: China, 76 percent (other major sources: Belgium, 11 percent; Bolivia, 6 percent).
- Barite: China, 25 percent; Mexico, 14 percent (others: India, 40 percent; Morocco, 17 percent).
- Fluorspar: Mexico, 62 percent; China, 8 percent (others: Vietnam, 14 percent; South Africa, 9 percent).
- Graphite: China, 43 percent; Canada, 13 percent; Mexico, 13 percent (others:

Figure 2

Industrial minerals from Canada, China and Mexico consumed in the United States that have a greater than 20 percent net import reliance to meet demand.

Country under US import tariff	Industrial mineral	Critical mineral?[1]	US net import reliance[2]	Total import volume 2024[3] (000s tonnes)	Country import share[4]	Primary market applications
CANADA	Alumina	N	59%	1,300	5%	abrasives; cement; ceramics; chemicals; flame retardants; refractories; water treatment
	Chromium	Y	77%	500	6%	chemicals; foundry; metallurgy; pigments; refractories
	Fused alumina	N	>95%	120	11%	abrasives; ceramics; refractories
	Graphite	Y	100%	60	13%	batteries; foundry; friction; metallurgy; refractories
	Iron oxide pigments	N	87%	180	7%	cement; construction; pigments
	Magnesia	N	52%	520	8%	agrimarkets; cement; ceramics; chemicals; construction; environment; flame retardants; metallurgy; refractories
	Mica (scrap, flake)	N	41%	20	35%	cement; oilfield; paint; pigments; plastics; rubber
	Nepheline syenite	N	>95%	470	99%	ceramics; glass; paint; pigments; plastics
	Potash	N	93%	6,100	79%	agrimarkets; chemicals
	Salt	N	24%	14,000	29%	agrimarkets; chemicals; environment; food/pharma
	Silicon carbide	Y	69%	110	3%	abrasives; ceramics; metallurgy; refractories
	Ti-minerals	Y	86%	600	13%	chemicals; paints; pigments; plastics; paper
CHINA	Antimony oxide	Y	85%	20	76%	batteries; ceramics; chemicals; flame retardants; glass
	Barite	Y	>75%	2,000	25%	chemicals; oilfield; paints; pigments
	Bauxite	N	100%	2,800	80%	abrasives; cement; chemicals; environment; metallurgy; oilfield; refractories
	Bromine	N	<25%	61	3%	agrimarkets; chemicals; environment; flame retardants; oilfield
	Fluorspar	Y	100%	440	8%	batteries; chemicals; electronics; metallurgy
	Fused alumina	N	>95%	120	64%	abrasives; ceramics; refractories
	Garnet	N	48%	100	9%	abrasives; filtration
	Graphite	Y	100%	60	43%	batteries; foundry; friction; metallurgy; refractories
	Iron oxide pigments	N	87%	180	43%	cement; construction; pigments
	Magnesia	N	52%	520	61%	agrimarkets; cement; ceramics; chemicals; construction; environment; flame retardants; metallurgy; refractories
	Mica (scrap, flake)	N	41%	20	40%	cement; oilfield; paint; pigments; plastics; rubber
	Mica (sheet)	N	100%	4	79%	cement; oilfield; paint; pigments; plastics; rubber
	Perlite	N	26%	180	4%	agrimarkets; construction; filtration; paints; pigments; plastics
	Rare earths	Y	80%	8	70%	ceramics; chemicals; electronics; glass; metallurgy
	Scandium	Y	100%	n.a.	n.a.	chemicals; glass; metallurgy
	Silicon carbide	Y	69%	110	85%	abrasives; ceramics; metallurgy; refractories
	Yttrium	Y	100%	0.5	93%	batteries; ceramics; chemicals; electronics; glass; magnets; metallurgy
MEXICO	Barite	Y	>75%	2,000	14%	chemicals; oilfield; paints; pigments
	Feldspar	N	33%	220	6%	ceramics; glass; paint; pigments; plastics
	Fluorspar	Y	100%	440	62%	batteries; chemicals; electronics; metallurgy
	Graphite	N	100%	60	13%	batteries; foundry; friction; metallurgy; refractories
	Salt	N	24%	14,000	14%	agrimarkets; chemicals; environment; food/pharma
	Strontium	N	100%	4	65%	ceramics; chemicals; glass; magnets; metallurgy; pigments

Notes
Source: based on USGS 2025 data for 2024.
[1] based on USGS Critical Minerals List 2022 & USDOE Critical Materials Assessment 2023.
[2] ie. overall US net import reliance for that mineral, specific import source countries can change annually, as can their respective share of US imports of that mineral
[3] ie. total volume of imports for US consumption of all grades (incl. for metallurgical uses) from all countries.
[4] ie. average import share during 2020-2023.
n.a. not available

Mozambique, 13 percent).
- Rare earth compounds and metals: China, 70 percent (others: Malaysia, 13 percent; Japan, 6 percent; Estonia, 5 percent).
- Silicon carbide: China, 85 percent; Canada, 3 percent (others: Brazil, 4 percent).
- Titanium minerals: Canada, 13 percent (others: South Africa, 32 percent; Madagascar, 16 percent; Australia, 11 percent).
- Yttrium: China, 93 percent.

Moreover, just to complete the picture on all possibilities: Trump announced earlier this year that he might also consider imposing 100 percent tariffs on the countries referred to as the BRICS+ countries (Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Indonesia, Iran and United Arab Emirates). This would also then impact several of the other source countries for these critical and other minerals on which the United States has high import dependency:

- Brazil: silicon carbide, plus fused alumina, magnesia, bauxite.
- South Africa: fluorspar, chromite, plus zircon.
- Vietnam, which recently became a partner of BRICS, is a key source of fluorspar for the United States.

"Noncritical" minerals also have significance

It is also important to be reminded of the other industrial minerals from Canada, China and Mexico not officially designated (yet) as "critical," though many U.S. manufacturing sectors strongly rely on these imports:

- Fused alumina: China, 64 percent, Canada 11 percent (others: Brazil, 7 percent; Austria, 5 percent).
- Bauxite: China, 80 percent estimated refractory grade (others: Guyana, Brazil)
- Magnesia
  - Caustic calcined magnesia: China, 73 percent; Canada, 21 percent.
  - Dead burned and fused magnesia: China, 70 percent (Brazil, 18 percent; Turkey, 3 percent).
  - Magnesium hydroxide: Mexico, 59 percent (others: Netherlands, 14 percent; Israel, 13 percent; Japan, 5 percent).
- Mica
  - Scrap and flake: China, 40 percent; Canada, 35 percent (others: India, 9 percent; Finland, 5 percent).
  - Sheet: China, 79 percent (others: Brazil, 6 percent; India, 4 percent).
- Nepheline syenite: Canada, 99 percent.
- Potash: Canada, 79 percent (others:

Russia, 11 percent; Belarus, 4 percent; Israel, 3 percent).

- Salt: Canada, 29 percent; Mexico, 14 percent (others: Chile, 27 percent; Egypt, 8 percent).
- Strontium: Mexico, 65 percent (others: Germany, 30 percent).

These are all stand-out minerals much needed for U.S. consumer sectors.

Fused alumina and bauxite are in high demand for refractory and abrasive manufacturing, with 75 percent fused alumina imported from China and Canada, and most refractory bauxite from China.

Likewise, all U.S. demand for dead burned and fused magnesia essential for refractories must be imported, and mostly from China.

Caustic calcined magnesia and potash (both from Canada) are essential to U.S. agrimarkets, with caustic calcined magnesia serving the dairy cattle market, and potash mainly for U.S. fertilizer production.

Magnesium hydroxide from Mexico is used in a range of markets including chemicals, water treatment and flame retardants.

Mica and salt use in the United States is also highly dependent on China and Canada (mica), and Canada and Mexico (salt). Salt markets are wide-ranging, but the northeast U.S. deicing market relies strongly on imports.

Strontium supply from Mexico is used in ceramics, chemicals, glass, magnets, metallurgy and pigments.

It should be said that it seems that certain minerals will not be subject to the reciprocal tariff — that is, those already subject to Section 232 tariffs — although some observers remain unclear on this. The official "Annex II" enumerates the following industrial minerals exempt "as ores, oxides, and salts": antimony, asbestos, barite, bauxite, chromite, fluorspar, fused alumina, graphite, iron oxides, lithium, magnesia, manganese, phosphate, potassium, rare earths, silicon carbide, strontium, titanium and yttrium.

However, industrial minerals imported by the United States that appear not to be exempt include nepheline syenite (greater than 95 percent; Canada), garnet (48 percent; South Africa, Australia, India and China), and those minerals with U.S. import dependency of less than 40 percent: bromine, feldspar, perlite, salt, vermiculite and zircon.

Impact on U.S. consuming markets

The last column of the table highlights the main market applications for these minerals and will be seen to include some very important sectors essential to the U.S. economy.

Many of these markets are intermediate manufacturing sectors that are imperative for ultimate end markets.

Refractories, ceramics and abrasives, for example, are vital to help manufacture components used in defence and military uses, as well as the primary use of refractories in all plants making steel, metals, glass, cement, ceramics and petrochemicals.

Regarding the rapidly evolving lithium-ion battery market, especially for electric-vehicle and municipal applications, fluorspar and graphite stand out as the critical minerals on which the United States relies 100 percent on imports from Canada, China and Mexico.

There are ongoing projects in the United States in trying to develop domestic sources for graphite and fluorspar, but how soon they will come to fruition is unclear, and certainly not in time to ease these immediate import tariffs.

If anything, perhaps this latest round of trade tariffs may provide a boost for such U.S. mineral development projects. For example, on March 20, Trump signed an executive order to drive U.S. mineral production, streamline permitting and enhance national security. "Minerals" covered by the order include critical minerals, uranium, copper, potash, gold, and any other element, compound or material as determined by the chair of the National Energy Dominance Council.

An accompanying White House statement commented: "The United States currently imports a significant portion of its minerals from foreign countries, creating economic and security risks, despite possessing a vast supply of critical minerals. A strong domestic mineral production industry would ensure U.S. companies can compete globally without overly relying on foreign supply chains." So, some, if belated, recognition of minerals' importance.

How the U.S. manufacturing sectors will absorb or pass on these cost increases for their required minerals is top of the agenda, as is the consideration of future exports to the United States by producing companies in Canada, China and Mexico. Perhaps, as has happened in the recent past, certain industries may be able to successfully lobby the U.S. government to exempt their minerals from the tariff list.

Regarding potash, the significance of any tariff impact on this mineral and its market was at least recognized very swiftly. Just two days after the March 4 decree, a reduction of tariffs was announced on potash not already covered under the United States-Mexico-Canada Agreement (USMCA; signed in Trump's first term) from 25 percent to 10 percent. U.S. Secretary of Agriculture Brooke Rollins described it as "… a critical step in helping farmers manage and secure key input costs at the height of planting season while reinforcing long-term agricultural trade relations." Could this sentiment be applied across other mineral consuming markets?

Meanwhile, this whole trade issue may also prompt U.S. (and other) industrial mineral consumers to start seeking alternative sources of mineral supply from nontariff-targeted countries, particularly near-shore, and even to consider switching to using alternative/recycled minerals from domestic sources. Challenges yes, but also opportunities. Let's see. ■

**Mike O'Driscoll is director and cofounder of IMFORMED Industrial Mineral Forums & Research Ltd, UK; organizing Fluorine Forum 2025, Baveno, Lake Maggiore, Oct. 22-24 and Salt Forum 2025, Abu Dhabi, Nov. 17-19; mike@imformed.com or visit www.imformed.com.*

BALL CLAY

by Dibyajyoti Behera, Ashapura Group of Industries

Ball clay is a type of clay whose name is derived from its early extraction methods in 18th-century England, when it was dug by spade as cubes, which then became rounded during subsequent transport. It is strong yet flexible, can withstand high temperatures during firing and helps create smooth, even surfaces in ceramics. As demand for ceramic items rise due to the ceramics boom, so does the demand for ball clay. It is commercially extracted through openpit mining, followed by multiple processing steps, including refining, blending, forming and firing.

Ball clay offers enhanced plasticity, excellent durability, high binding strength, low iron content, easy moldability and good drying properties. It is also a cost-effective, versatile, readily available and chemically stable product that improves the color and texture of finished goods. As a result, ball clay finds extensive applications across the construction, ceramics, foundry, paints and coatings, refractory and agriculture industries.

Market size and growth

The ball clay market size is estimated at $455.30 million in 2025 and is expected to reach $583.03 million by 2030, at a compound annual growth rate of 5.07 percent during the forecast period (2025 to 2030). The global ball clay market has been experiencing steady growth, driven by its extensive use in the ceramics industry, including applications in tiles, sanitary ware and tableware.

Export and imports

More than 91 countries contribute to the global import of ball clay. India is the largest importer with 5,119 import shipments, for a market share of 38 percent. Following India, Bangladesh is the next key player with 3,251 shipments and a 24 percent market share. Vietnam's 1,504 shipments translates into an 11 percent market share.

A total of 52 countries export ball clay globally. The leading suppliers are India, the United Kingdom and the United States. India tops the list with 3,394 shipments, which equates to a 22 percent market share. It is closely followed by the United Kingdom with 2,890 shipments, representing a 21 percent market share, and the United States with 2,832 shipments, for a 21 percent market share.

Outlook

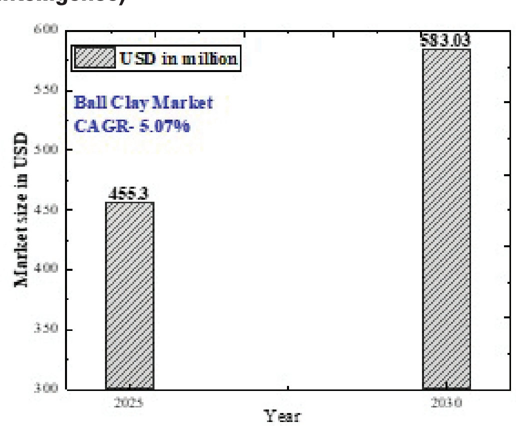
The Asia Pacific and North American ball clay markets are experiencing growth driven by demand in the ceramics and construction sectors. The growing demand for lightweight and durable materials in the automotive and aerospace industries further supports market expansion. Advancements in mining technologies are improving extraction efficiency, enhancing product quality and reducing environmental impact. Additionally, the widespread adoption of ball clay in sanitary-ware manufacturing and the growing popularity of aesthetically appealing ceramic tiles are key trends shaping the region's market dynamics.

Key players

Leading ball clay market companies include Ashapura Group of Industries, Ashok Alco-Chem Ltd, Finore Minerals LLP, G&W Mineral Resources (Zimco Group (PTY) Ltd), Garg Minerals and Chemicals, Golcha Associated Exports LLP, Gujarat Mineral Development Corporation Ltd, Imerys S.A., JLD Minerals Private Ltd, Old Hickory Clay Co., Plainsman Clays Ltd and Sibelco.

Figure 1

Ball clay market size, 2025-2030. (Source: Mordor Intelligence)



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